

# DIP Chap2 & Scientific Writing

- Some of the researches of DIP Chap2
- The course Presentation Techniques & Scientific Writing
- Work arrangement in latter period

# Digital Image Fundamentals

- Vary the number of intensity levels
- Addition of noisy images
- Image rotation & intensity interpolation
- Image registration

# Vary the number of intensity levels



256-level image



64-level image



16-level image



8-level image



4-level image



2-level image

# Addition of noisy images



$$g(x, y) = f(x, y) + \eta(x, y)$$

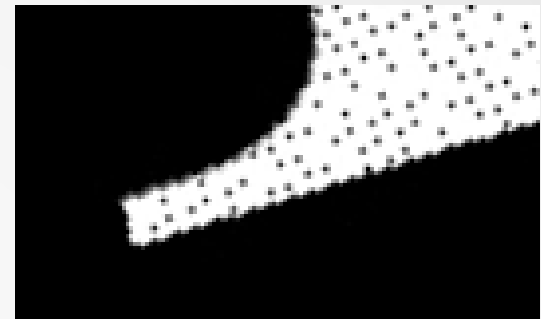
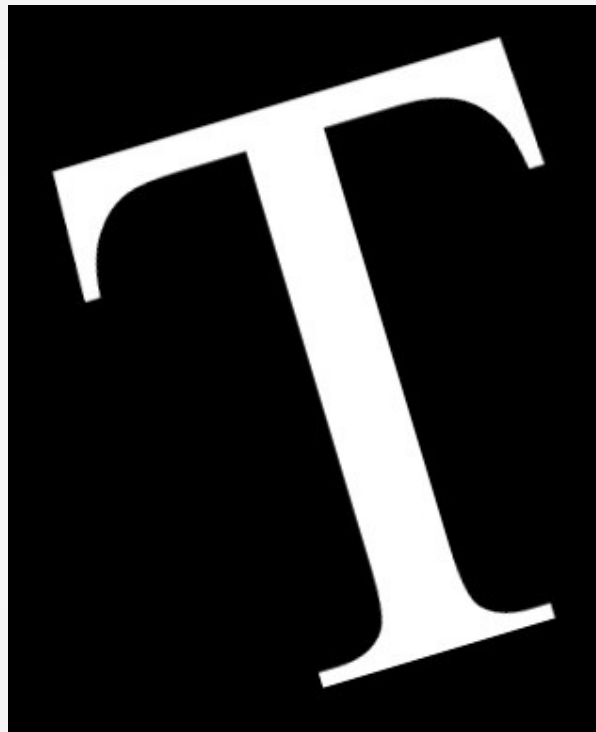
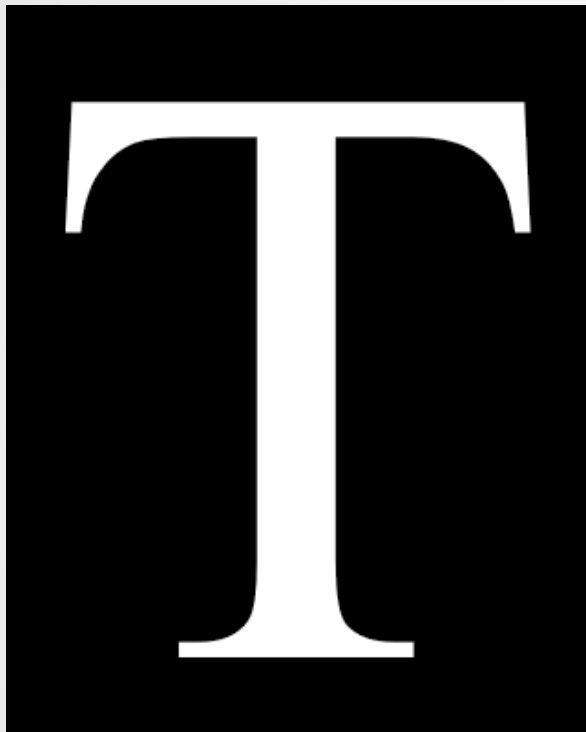
$$\bar{g}(x, y) = \frac{1}{K} \sum_{i=1}^K g_i(x, y)$$

$$\sigma_{\bar{g}(x, y)} = \frac{1}{\sqrt{K}} \sigma_{\eta(x, y)}$$





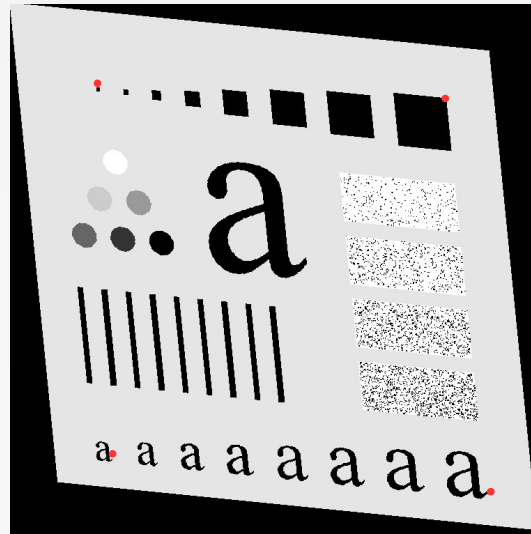
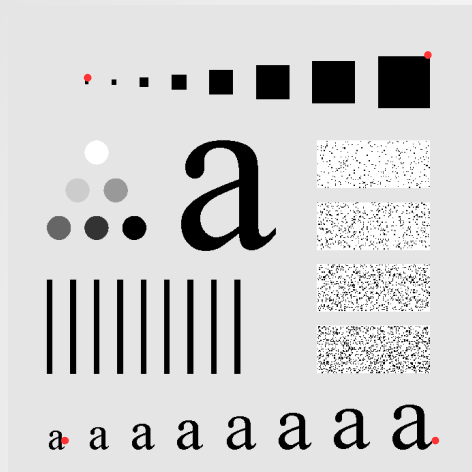
# Image rotation & intensity interpolation



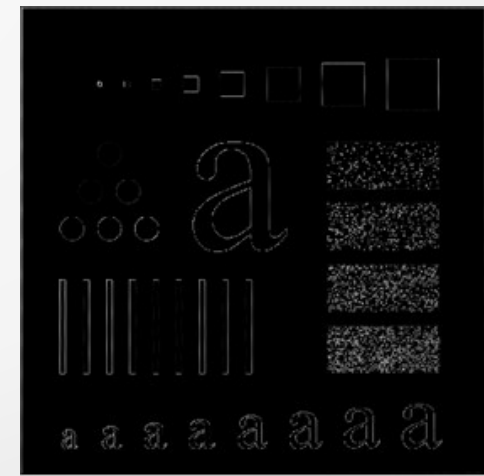
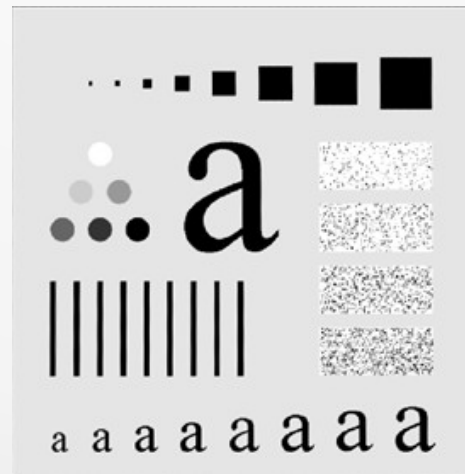
$$x = v \cos(\theta) - w \sin(\theta)$$

$$y = v \sin(\theta) + w \cos(\theta)$$

# Image registration



$$x = c_1 v + c_2 w + c_3 vw + c_4$$
$$y = c_5 v + c_6 w + c_7 vw + c_8$$



# Presentation Techniques & Scientific Writing

- Introduction in presenting science
- Rules on how to write
- Guidelines on how to edit
- Peer-review process

# Dr. Annette Ladstätter-Weißmayer



## Chemistry and Physics of the Atmosphere

1982 – 89: Studies of Chemistry, at University of Mainz, Germany, Diploma Thesis in Atmospheric Chemistry, Max Planck Institute for Chemistry, Department of Airchemistry in Mainz, Germany (Thesis Title: Providing of reference spectra of stratospheric trace gases in UV/VIS wavelength region 1993: Ph.D. Max-Planck Institute for Chemistry, Department of Airchemistry in Mainz, Germany, (Thesis Title: Spectroscopic analysis of nitrogen compounds using the DOAS system) since 1993: Post doc, Institute of Environmental Physics and Remote Sensing, University Bremen, Germany, with Prof. Dr. John P. Burrows 1998 – now: “Habilitation” in Physics, Institute of Environmental Physics and Remote Sensing, University Bremen, Germany, with Prof. Dr. John P. Burrows

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## Research Interests

Environmental Analytical Chemistry

Atmospheric Chemistry and Physics

Analysis of satellite based GOME (Global Ozone Monitoring Experiment) data with respect to tropical tropospheric O<sub>3</sub> and pollution events



# Writing & reading

*“To understand why we write we must understand why we read.*

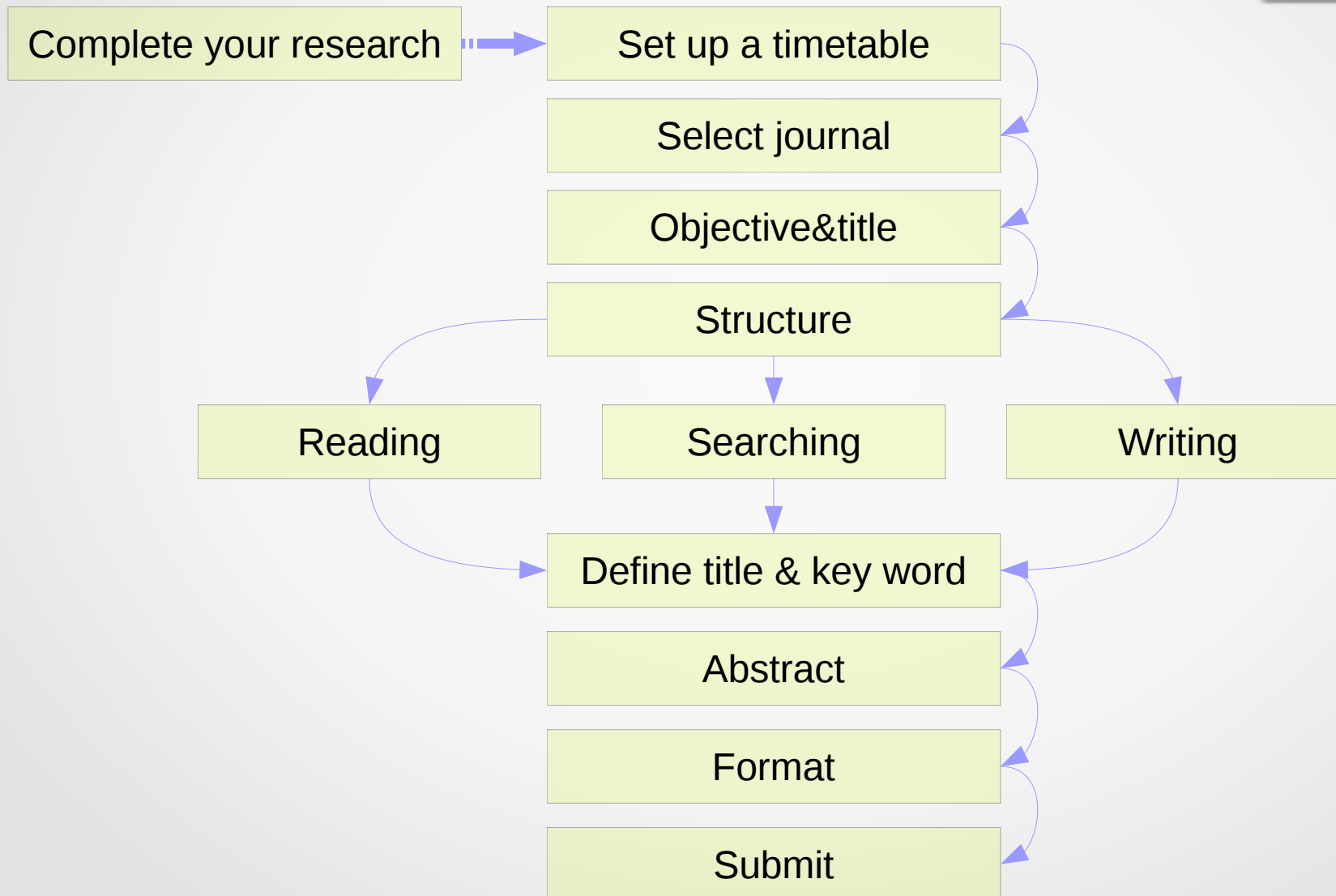
*The writer who understands why people read will understand how to write.”*

(Martin, 2005)

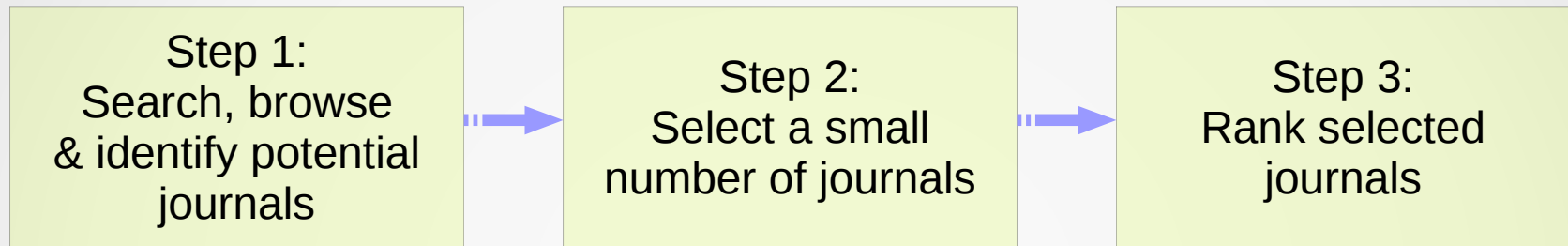
# Basic writing rules

- Plan for writing daily
- Draft & review thoughts before writing
- Brevity
- Read other papers
- logic & clarity
- organize around key sentences
- structure your paper
- clean & attractive presentation

# How to prepare for a presentation?



# How to select a journal



Identify & browse

a b c d e f g h i j k

select

c f i

rank

1 2 3



# Objective & title

- Start with an explicit statement or use bullets
- Objectives should have a clear focus
  - rather narrow than broad
  - better answer 1 question well than 3 superficially
- Write objectives in one separate paragraph





# Structural elements



Title

Subtitle&catalogue



Key words



Abstract

Introduction

Methods

Results

Discussion

Conclusion



Acknowledgement



References



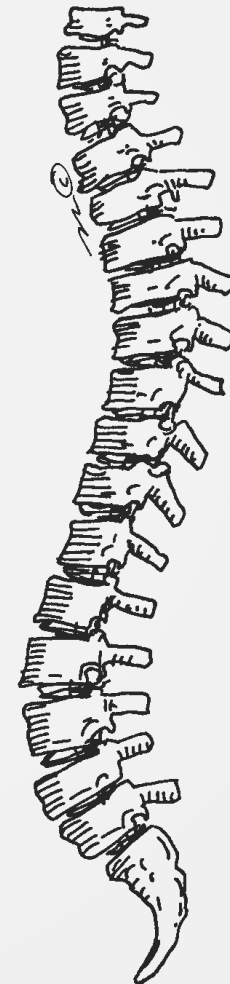
Appendix

Figures

Tables



Author state



# Title

Most frequently read part of a paper!

Title should be:

- Short
- informative
- include subject of your study (= main keyword)
- should tell what the paper is about



# Key words

- identify 5-10 words that help to characterize your paper content
- use synonyms
- avoid duplication with title
- test your keywords in a keyword search/database



# Abstract

- write abstract as last part of the paper
- summarize each section of your paper in 1-3 sentences below the following five headings:
  - Introduction
  - Methods
  - Results
  - Discussion
  - Conclusions
- remove headings & restructure into one paragraph



# Introduction

- Background – what is the problem?
- Motivation – why is it important?
- State-of-the-art – what has been done before?
- Knowledge gaps – what is currently missing?
- Aims & objectives – what is the paper doing?
- Definitions – what unfamiliar terms does the paper use?





# Methods

- describe what you have done in such a detail as needed so
- that it is replicable by a colleague
- follow chronological order
- use sub-headings to describe individual steps
- be as precise and concise as possible
- provide exact numbers where possible



# Results

- Refer to objectives
- Select those results from your data, which reflect the objectives
- Structure the section, use headings and subheadings
- Identify information that can be displayed in figures and tables
- Fill in each heading, describe results short and precisely
- Do not discuss results, do not present new methods



# Discussion

- What can be generalised from your results?
- What are unexpected results?
- What are methodological limitations?
- How do own results relate to other findings?
- What are theoretical/practical implications?



# Conclusion

- State your overall objective in one sentence again
- State your key message
- Write conclusions according to your list
- Should be understandable when read in isolation
- Give to a colleague to read and comment



# Acknowledgement

- optional section
- no influence on acceptance or rejection
- keep short
- always give credit for financial support
- ask people whether they agree to be acknowledged





# References

Passive use:

“... as previous results have shown (Miller, 2006).”

Active use:

“Miller (2006) has shown in her study ... The results of Peterson (2007) confirm these results...”



# Appendix

- to present additional data that are not critical to understanding the manuscript
- can include example of a questionnaire, complex equations, calculations or a data table with detailed results that are of interest to the expert
- optional section, most papers do not need appendix



# Author statement

Include author statement to certify that:

- the work is all original research carried out by the authors
- all authors agree with the content of the manuscript and its submission to the journal
- no part of the research has been published elsewhere, unless it is fully acknowledged in the manuscript
- the manuscript is not being considered for publication elsewhere while it is being considered for publication in this journal
- any research in the paper not carried out by the authors is fully acknowledged in the manuscript

# Guidelines on how to edit

- Keep writing and editing separate
- Come with a fresh mind to editing & revising
- easier to edit once you have some distance to the paper
- You will need several rounds of editing & revision

# Language & style revision

- Rule 1: good English
- Rule 2: inclusive language
- Rule 3: active vs. passive
- Rule 4: abbreviations
- Rule 5: avoid use of “often” , “and/or” , “only”, “quite”
- Rule 6: one expression
- Rule 7: read out loud
- Rule 8: provide evidence
- Rule 9: use of tenses
- Rule 10: use of numbers
- Rule 11: shorten

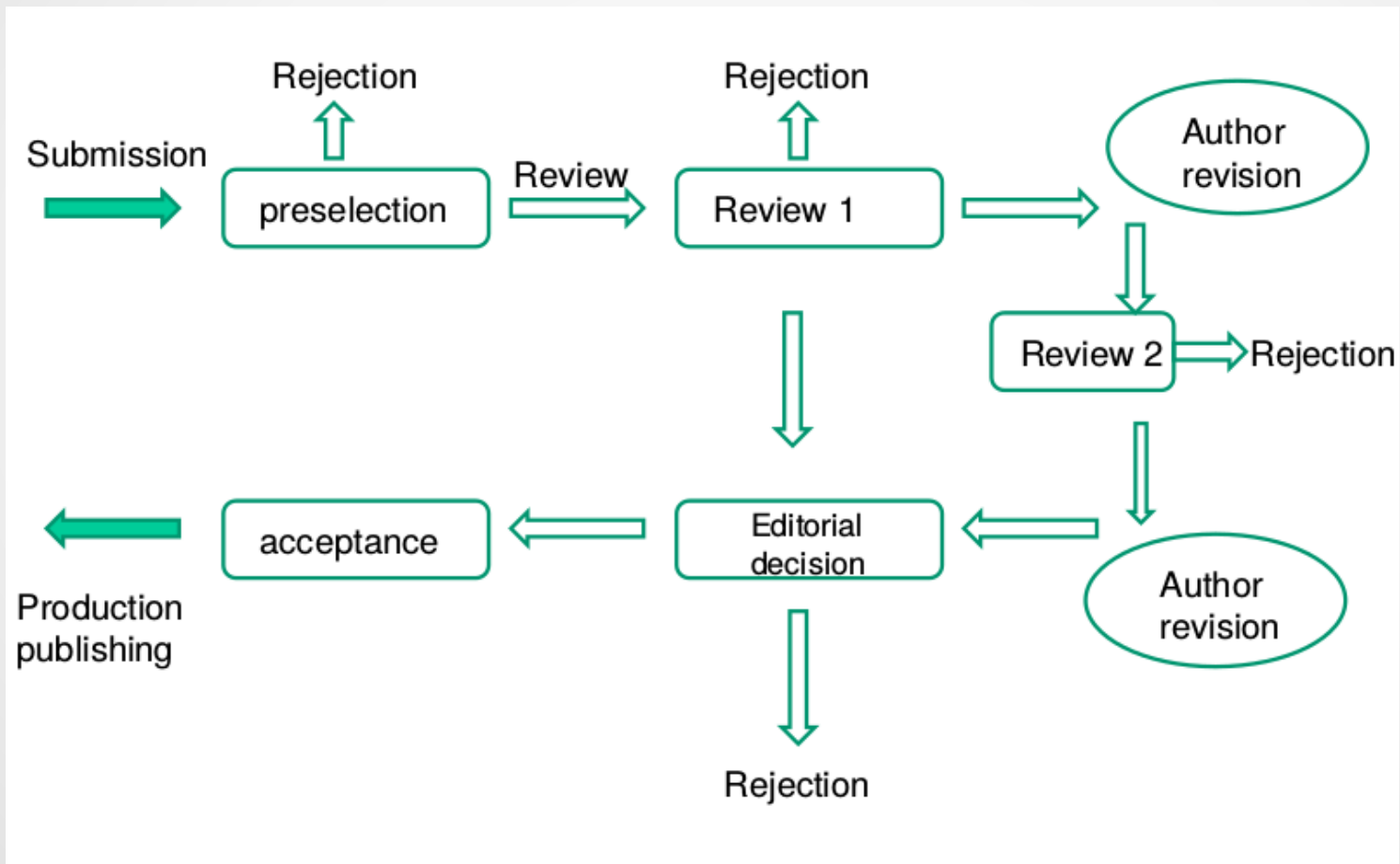


# Cover letter

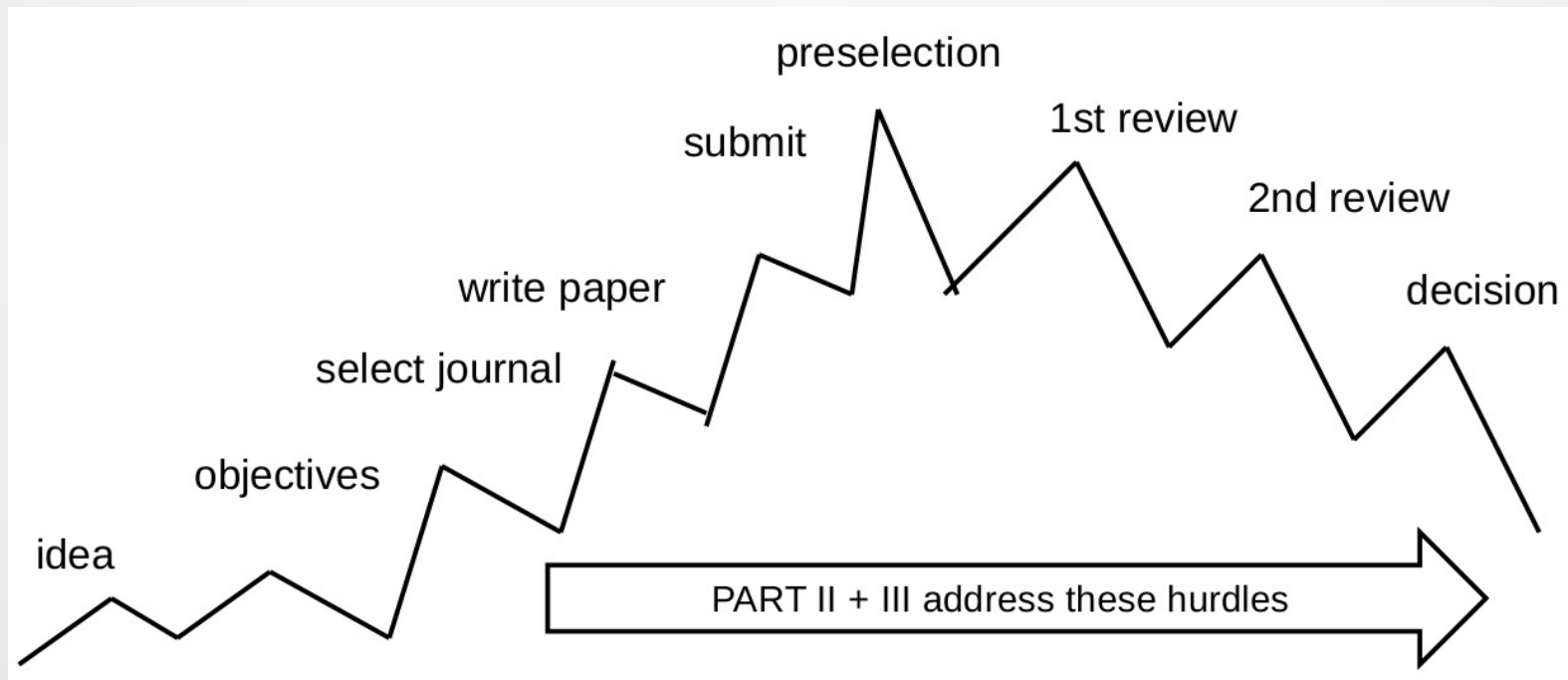
Include:

- corresponding author's full name, affiliation and the address that can be used for correspondence (all in English)
- address the letter to the responsible journal editor (state name – “avoid “clear editor”)
- submission date
- manuscript title
- name of co-authors
- journal section where the manuscript should be published (if applicable)
- 2 sentences describing the manuscript (main findings)

# Peer-review process



# Peer-review process

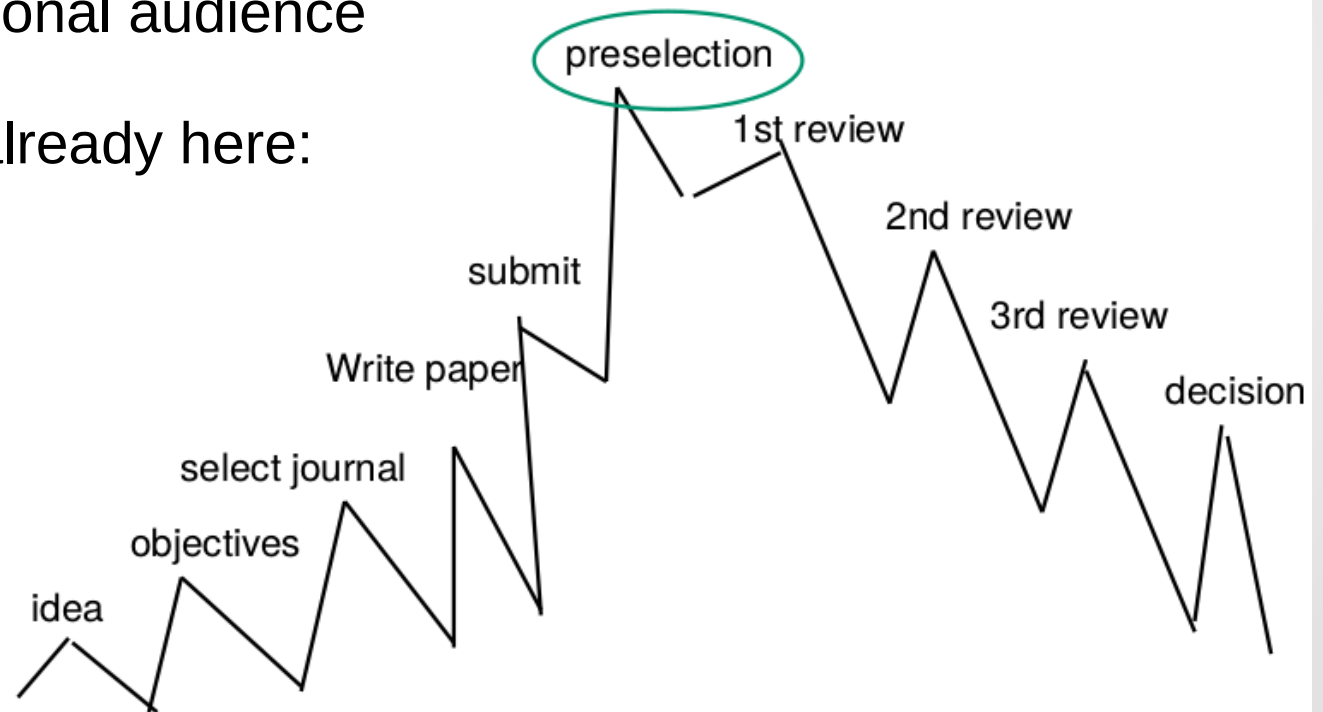


# Preselection

- formal criteria (submission complete, proper formatting of manuscript)
- within scope of the journal
- new and original contribution
- relevance for international audience
- sufficient quality

40-50% of papers fail already here:  
rejected!

Biggest hurdle!



# Review sheet

**1. Is the paper within the scope of the journal?**

Yes	No	If no, comments:

**2. Is it a new and original contribution?**

Yes	No	If no, comments:

**3. Does the paper exemplify an awareness of other research on its topic?**

Yes	No	If no, comments:

**4. Is the paper of relevance to an international audience?**

Yes	No	If no, comments:

**5. Does the title of this paper clearly reflect its content?**

Yes	No	If no, comments:

**6. Is the abstract sufficiently informative especially when read in isolation?**

Yes	No	If no, comments:

**7. Are the keywords informative?**

Yes	No	If no, comments:

**8. Is the statement of objectives of the paper adequate and appropriate in view of the subject matter?**

Yes	No	If no, comments:

**9. Does the introduction section introduce the paper subject, is the research context of relevance?**

Yes	No	If no, comments:

**10. Are the methods correctly exposed and sufficiently informative to allow replication of the research?**

Yes	No	If no, comments:

**11. Are the results clearly presented?**

Yes	No	If no, comments:

**12. Is a discussion provided that relates the findings of this paper to existing knowledge on an international level?**

Yes	No	If no, comments:

# Review sheet

13. Are interpretations and conclusions sound and justified by the data?

Yes	No	If no, comments:

14. Is the structure and organization satisfactory and is the paper clearly presented?

Yes	No	If no, comments:

15. Is the length appropriate to the content?

Yes	No	If no, comments:

16. Are the illustrations and tables all necessary and are the captions adequate and informative?

Yes	No	If no, comments:

17. Are the references adequate and in agreement with the Guide for Authors?

Yes	No	If no, comments:

18. Is the quality of the English satisfactory?

Yes	No	If no, comments:

19. Can you suggest changes or brief additions (words, phrases) that will increase the value of this paper or an international audience?

Yes	No	If no, comments:

20. Can you make any suggestions that will increase the value of this paper for the journal „XXX JOURNAL NAME XXX“

Yes	No	If no, comments:

21. Can you suggest any reductions in the paper, or deletions of parts?

Yes	No	If no, comments:

22. Have you made any annotations on the manuscript?

Yes	No	If no, comments: